



Photo by Damon Leo (www.damonleo.com)



Faster Isn't Smarter: Messages About Math, Teaching, and Learning in the 21st Century

Cathy L. Seeley

Based on Cathy L. Seeley's award-winning NCTM President's Messages, and including dozens of new messages, this must-have resource offers straight talk and common sense about some of the most thought-provoking and important issues today. With topics ranging from the impact of rising expectations and the trap of timed tests to the role of technology and the phenomenon of jumping on bandwagons, this book provides a base for lively discussion among teachers, parents, leaders, and policy makers.

The following is a pre-release excerpt from **Faster Isn't Smarter**.

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Math for a Flattening World

Reshaping school mathematics for the 21st century

In the bestseller *The World Is Flat*, *New York Times* columnist Thomas L. Friedman proposed the notion that the world is flattening—meaning that around the world the competitive playing field is being leveled, especially with respect to jobs. More people in more countries, including those countries once excluded from economic opportunities, now hold jobs in multinational companies and are raising their quality of living to join the middle class. With the increasing availability of technology, it is no longer necessary for societies to rely on hierarchical structures for access to information. Today, information flows horizontally—available equally to anyone with access to a computer—producing competitors and connecting colleagues from around the world. An international company can have offices in India, China, Malaysia, Brazil, Poland, Russia, or any one of a growing number of nations that offer well-educated, cost-effective workers. No one would have predicted just a few years ago that Dell Computers would build a facility in Poland, yet the multinational company did just that, giving Poland a significant economic boost. With the spread of Friedman's "flattening" phenomenon, the international talent pool of professionals such as computer programmers and other technology specialists is expanding. As mathematics educators, our responsibility must be to equip our students with the skills and abilities not only to survive but also to thrive in this global village—a flat world.

More Math

For some time, those of us involved in mathematics education have joined with the business sector to advocate for a more mathematically literate population and for programs that prepare more students for careers in science, technology, engineering and mathematics. Suppose we succeed? Suppose we create a generation of citizens who know mathematics well, with many who can conduct basic research or work in programming or design. Even then, it is possible that citizens prepared in these areas may not be employable—their salary requirements may price them out of jobs. Professionals in India and China now hold large numbers of basic programming and technical jobs for companies in North America and around the world, and officials in both countries have indicated their commitment to move beyond these basic jobs and fill higher-level jobs in research and innovation. In 2004, China was reported to have produced approximately one million engineers. And countries like India, Korea, Turkey, and Iran have invested heavily in scientific research with an eye to the future.

Pre-release excerpt from *Faster Isn't Smarter: Messages About Math, Teaching, and Learning in the 21st Century* by Cathy L. Seeley.

The United States prides itself on having an edge in creativity and innovation. But how long can we maintain this edge in an environment where a commitment born of sheer national will can bring a developing nation into economic prominence?

If scientific and engineering jobs are likely to be outsourced, should we abandon the goal of a high-quality mathematics education for every student? On the contrary. If we are looking toward a global future, we must redouble our efforts to equip our citizens with a working knowledge of mathematics, along with the scientific and economic knowledge that builds on that mathematics. Friedman's book, *Hot, Flat, and Crowded* points out that we are facing an era focused around energy and climate, making it even more urgent to prepare students so they can use mathematics and science to tackle energy and climate crises.

An important element of this kind of education is a commitment to go beyond teaching basic skills, beyond requiring students to know how to perform procedures, and beyond offering recipes for solving problems that look alike. To limit our students to such mathematics void of critical thinking is to barely equip them for the bottom tier of jobs the United States now outsources. We need to expect much more of all our students if they are to compete for the kinds of jobs that help businesses and societies solve the problems they face every day—problems they don't yet know how to solve; problems that call for the best creative thinking and problem solving skills we can bring to the table; problems that require that our students don't just know mathematics—they understand mathematics.

The Edge

The United States can still have a competitive edge. That edge will come, in part, from the advantage of traditional American ingenuity, creativity, and innovation—if we are committed to helping students develop in these areas. But the value of this advantage may diminish as other nations increase their investment in scientific research and their commitment to become more innovative. However, Americans have another advantage that has been cited by those who do business internationally. Americans are said to have the ability to see the big picture, understand connections, and build on relationships among people and among ideas. In addition to mathematical knowledge, these qualities should be nurtured and developed in our schools. Teaching in collaborative, “big picture” ways will prepare students to solve problems that no one has ever seen before; and help the United States remain at the forefront of science, technology, and invention.

What Can We Do?

Our educator colleagues in Japan and other countries often teach with far less *telling* than American educators do. Classroom observations that were part of the Third International Study of Science and Mathematics (TIMSS)¹ show that it is far more customary for these mathematics teachers than for American teachers to present students with a problem without first telling them all the steps they should follow to solve it. Our tendency in the United States is to spoon-feed our students—telling them exactly how to solve a certain type of problem and then asking them to practice solving similar problems. The TIMSS observers found that even when American teachers started with a challenging task, they almost always gave students excessive guidance or intervened as soon as students had difficulty.

In more and more mathematics classrooms on this side of the globe, however, teachers are beginning to realize that they can guide students' learning without doing all the work for them. They are beginning to see the power of letting students struggle a bit to determine how to solve a problem before helping them find the best or most efficient approach(es) to the problem. Many students are not only beginning to have more opportunities for critical thinking but are beginning to have

¹ After the Third International Study, TIMSS was renamed to *Trends in Mathematics and Science Studies* to include future studies.

Math for a Flattening World continued

the opportunity to work collaboratively on problems relevant outside of a mathematics textbook. This prepares them to work in teams—a requirement to thrive in today's business world.

I am convinced that we have the ability to adapt successful strategies from Japan and other countries and improve on them at least one notch by tapping into our uniquely American tendencies toward developing creativity, connecting ideas, and understanding relationships. Why not teach in ways that provide students with challenging problems, help them build perseverance, and develop their creativity? This is no small task, but it is well worth the effort if our students are to succeed in the flat world of the 21st century.

Reflection and Discussion

For teachers

- What issues or challenges does this message raise for you? In what ways do you agree with or disagree with the main points of the message?
- How can we change our day-to-day teaching to reflect the changing (flattening) world?
- In thinking globally, what barriers do you face—among teachers, students, or the broader community?
- How can we shift our instructional practice to accommodate the changing way people work in teams in the workplace and to help students learn to both ask and answer challenging questions?

For families

- What questions or issues does this message raise for you to discuss with your student, your student's teacher, or with school leaders?
- In what ways might the kind of mathematics you learned be different from the kind of mathematics your student needs for his or her future?
- In what ways might the way you learned mathematics be different from the best way for your student to learn mathematics?

For leaders and policy makers

- How does this message reinforce or challenge policies and decisions you have made or are considering?
- How do your policies and priorities reflect a flattening world that looks very different from the world when we went to school?
- How have you accommodated the inclusion of overarching skills like collaboration, critical thinking, and communication?
- How does your mathematics program develop emerging skills like complex problem solving or in-depth projects?

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